REMARKS

Claims 1-35 are pending in this application. Claims 27 and 28 are objected to because the term "machine accessible medium" does not provide limit as to what type of machine and medium is utilized. Claims 1-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,835,693 ("Lynch et al.") in view of U.S. Patent No. 5,892,849 ("Chun et al."). Claims 1, 2, 5, 9, 11, 12 and 14-28 have been amended. Claims 29-35 are new. The applicant respectfully traverses the rejections and requests reconsideration in view of the amendments and following remarks.

I. Interview Summary

The applicant's representative, Brenda Leeds Binder of Fish & Richardson P.C., conducted a telephonic interview with the Examiner on April 28, 2004. Claims 1 and 11 were discussed in view of the references Lynch and Chun. Proposed amendments to the claims were also discussed.

II. Claim objections

The Examiner objected to claims 27 and 28 as failing to limit the type of machine and medium used. Applicant has amended claims 27 and 28 for clarification and respectfully submits that the objection has been overcome.

III. Section 103(a) rejections

Claims 1-10, 14-23 and 27

Claims 1-10, 14-23 and 27 stand rejected as being unpatentable over Lynch in view of Chun. Claim 1, as amended, recites a method including a step of receiving an assembly of components, where a first component moves relative to a second component, and a selection of a center of motion for the first component. A selection of the first component of the assembly associated with the selected center of motion is received. The motion of the first component relative to the second component is defined by reference to the center of motion. A range of motion is determined for the first component. A selection of an origin for a grid pattern is received, and the grid pattern is automatically generated based upon the determined range of motion. The grid pattern is automatically displayed at the selected origin.

By way of an illustrative example, the first component may be the bucket arm 315 shown in the applicant's FIG. 3, which bucket arm 315 moves relative to a pin joint 320. The location of the pin joint 320 can also represent the center of motion of the bucket arm 315. A range of motion of the bucket arm 315 is determined, for example, as illustrated in FIG. 5A. The curve 570 in FIG. 5A represents the range of motion of the bucket arm 315 about the center of motion.

Center of Motion

Neither Lynch nor Chun, either alone or in combination, disclose or suggest receiving an assembly of components, where a first component moves relative to a second component, and receiving a selection of a center of motion for the first component, where the motion of the first component relative to the second component is defined by reference to the center of motion.

The Examiner asserts that col. 53 lines 40-41 and col. 54 lines 42-47 of Lynch disclose receiving a selection of a center of motion for an assembly of CAD models of a mechanical design. The applicant respectfully disagrees. Col. 53 lines 40-41 includes a description of viewing controls in which a view can be rotated about an axis of rotation (col. 53 lines 13-48). A mouse can be used to change the viewing orientation in "screen space", such that, *e.g.*, "moving the mouse to the right will always rotate the system view about the y-axis of the screen (col. 53 lines 29-31). The user can choose any point in space as a "center of rotation reference point" about which the view can be rotated (col. 53 lines 36-42). Additionally, col. 54 lines 42-47 of Lynch describe a view menu which allows a user to select or load a "saved viewing direction and position and center of rotation position." The selection of a center of rotation of a screen view of an object is completely unrelated to the selection of a center of motion for one or more components of an assembly, as required by claim 1.

The Examiner also points to col. 5 lines 18-25 of Chun, as disclosing a center of motion. Specifically, the Examiner states that the "information of the object" described in the cited section is the center of motion. The applicant respectfully disagrees. Chun is directed toward compression of video data. Chun describes a technique for judging unit regions in order to reduce the size of image information particularly the information describing the movement of an image in one frame from the preceding frame. Storing or transmitting a series of high resolution images, such as frames in a movie, requires a large amount of storage space (col. 1 lines 31-42). The image data can be reduced by estimating the motion in an image in the current frame from

the previous frame (col. 4 lines 4-8). A frame divided into a plurality of rows and columns provides a grid of unit regions having the same size and shape (col. 2 lines 16-21). The "judgment" of unit regions, described in lines 18-25 of col. 5, is performed by moving the grid of unit regions with respect to an image object such that the object occupies a minimum number of unit regions. The motion of an object (*e.g.,* a change in position of an image from the preceding frame) can be estimated using the "judged unit regions" and detecting the position of the grid using the information of the object (*see also* FIGS. 18(a) and 18(b), illustrating a change in unit regions after movement and col. 22 lines 18-36). At no point in the cited section, in fact in the entire specification, is reference made to selecting a center of motion where the motion of a first component relative to a second component is defined by reference to the center of motion, as required by claim 1.

Accordingly, neither Lynch nor Chun disclose the limitations of claim 1, which is therefore in condition for allowance.

Range of Motion

Claim 1 is allowable for at least the additional reason. Neither Lynch nor Chun, alone or in combination, disclose or suggest determining a range of motion for a first component, and automatically generating a grid pattern based upon the determined range of motion. The Examiner contends that Chun discloses determining a range of motion for a component, however, the Examiner fails to provide the column citation for this contention. In any event, the applicant respectfully disagrees. Chun does not describe a range of motion for any components. As described above, Chun deals with estimating the movement of an image using judged unit regions and detecting the position of the grid of units. Further, in Chun, the actual position of the image in each frame is known, there is no desire to determine a range of motion for the image because the actual motion can be discovered by viewing the next frame. Because neither Chun nor Lynch disclose or suggest determining a range of motion for a component, the applicant respectfully submits that claim 1 is in condition for allowance.

Claims 2-10 depend from claim 1 and are therefore allowable for at least the same reasons as stated above in reference to claim 1.

Claim 14 recites a computer program product, tangibly stored on a computer-readable medium, comprising instructions operable to cause a programmable processor to receive an

assembly of components, where a first component moves relative to a second component and receive a selection of a center of motion for the first component. The first component associated with the center of motion is selected and the motion of the first component relative to the second component is defined by reference to the center of motion. A range of motion is determined for the first component. A selection of an origin for a grid pattern is received, and the grid pattern is automatically generated based upon the determined range of motion. The grid pattern is automatically displayed at the selected origin.

Claim 27 recites an apparatus including a processor and a computer program product, tangibly stored on a computer-readable medium, comprising instructions operable to cause a programmable processor to receive an assembly of components, where a first component moves relative to a second component and receive a selection of a center of motion for the first component. The first component associated with the center of motion is selected and the motion of the first component relative to the second component is defined by reference to the center of motion. A range of motion is determined for the first component. A selection of an origin for a grid pattern is received, and the grid pattern is automatically generated based upon the determined range of motion. The grid pattern is automatically displayed at the selected origin.

As discussed above in reference to claim 1, neither Lynch nor Chun disclose receiving an assembly of components, where a first component moves relative to a second component, and receiving a selection of a center of motion for the first component, where the motion of the first component relative to the second component is defined by reference to the center of motion. Nor do Lynch nor Chun disclose determining a range of motion for a first component, and automatically generating a grid pattern based upon the determined range of motion. Accordingly, claims 14 and 27 are allowable over Lynch in view of Chun. Claims 15-23 depend from claim 14 and are allowable for at least the same reasons.

<u>Claims 11-13, 24-26 and 28</u>

Claim 11 recites a method including receiving an assembly of components, where a component moves relative to one or more other components. A selection of the component is received, where the component is associated with one or more constraints that define a relationship of the component to one or more other components of the assembly (*e.g.*, relative motion or a relative position). A range of motion for the component is determined based on the

one or more constraints. A grid pattern is automatically displayed based upon the determined range of motion for the component.

For reasons stated above in reference to claim 1, neither Lynch nor Chun, alone or in combination, disclose or suggest receiving an assembly of components, where a component moves relative to one or more components, and determining a range of motion for a component. Further, neither Lynch nor Chun disclose a component that is associated with one or more constraints that define a relationship of the component to one or more other components of the assembly. Claim 11 recites determining a range of motion based on the one or more constraints. For example, as an illustration, the range of motion of the bucket arm 315 is represented by the curve 570 in FIG. 5A, which range of motion is determined based on constraints that define a relationship of the bucket arm to one or more other components of the assembly, such as the motion of the bucket arm relative to the pin joint 320. Neither Lynch nor Chun disclose determining a range of motion, and more particularly, using such constraints to determine a range of motion. Accordingly, claim 11 is in condition for allowance.

Claims 12 and 13 depend from claim 11 and are therefore allowable for at least the same reasons.

Claim 24 recites a computer program product, tangibly stored on a computer-readable medium, comprising instructions operable to cause a programmable processor to receive an assembly of components, where a component moves relative to one or more other components. A selection of the component is received, where the component is associated with one or more constraints that define a relationship of the component to one or more other components of the assembly. A range of motion for the component is determined based on the one or more constraints. A grid pattern is automatically displayed based upon the determined range of motion for the component.

Claim 27 recites an apparatus including a processor and a computer program product, tangibly stored on a computer-readable medium, comprising instructions operable to cause a programmable processor to receive an assembly of components, where a component moves relative to one or more other components. A selection of the component is received, where the component is associated with one or more constraints that define a relationship of the component to one or more other components of the assembly. A range of motion for the component is

determined based on the one or more constraints. A grid pattern is automatically displayed based upon the determined range of motion for the component.

For the reasons stated above in reference to claim 11, neither Lynch nor Chun, alone or in combination, disclose or suggest receiving an assembly of components, where a component moves relative to one or more components, and determining a range of motion for a component. Further, neither Lynch nor Chun disclose a component that is associated with one or more constraints that define a relationship of the component to one or more other components of the assembly. Accordingly, claims 24 and 27 are in condition for allowance. Claims 25 and 26 depend from claim 24 and are therefore allowable for at least the same reasons.

IV. New Claims

Claim 29 depends from claim 1 and recites the method of claim 1, where the first component is associated with one or more constraints that define a position of the first component relative to the second component, and the determining a range of motion step includes determining a range of motion based on the one or more constraints.

Claim 30 depends from claim 14 and recites the computer program product of claim 14, wherein the first component is associated with one or more constraints that define a position of the first component relative to the second component, and the range of motion is determined based on the one or more constraints.

Claim 31 depends from claim 27 and recites the computer program product of the apparatus of claim 27, wherein the first component is associated with one or more constraints that define a position of the first component relative to the second component, and the range of motion is determined based on the one or more constraints.

For reasons discussed above in reference to claim 11, neither Lynch nor Chun disclose a component associated with one or more constraints that define a relationship of the component to another component and determining a range of motion of the component based on the constraints.

Claim 32 recites the method of claim 11, wherein the one or more constraints include at least one constraint defining a position of the component relative to one or more other components of the assembly. Claim 33 recites the method of claim 11, wherein the one or more

constraints include at least one constraint defining motion of the component relative to one or more other components of the assembly. Claims 34 and 35 include similar limitations with respect to the apparatus of claim 28. Neither Lynch nor Chun disclose a component associated with one or more constraints that define either a position or the motion of the component relative to one or more other components of the assembly.

Brenda Leeds Binder has been given limited recognition under 37 CFR § 10.9(b) as an employee of the Fish & Richardson PC law firm to prepare and prosecute patent applications wherein the patent applicant is a client of Fish & Richardson PC and the attorney or agent of record in the applications is a registered practitioner who is a member of Fish & Richardson, which is the case in the present application. A copy of the Limited Recognition document, which expires July 16, 2004, is attached hereto.

Please charge the fees of $126.00 for the additional seven dependent claims to deposit account 06-1050.

A Petition for one month's Extension of Time is enclosed herewith authorizing the $110 fee therefor to be charged to deposit account 06-1050.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: May 3, 2004

Brenda Leeds Binder
Limited Recognition under 37 CFR § 10.9(b)

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